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Building & Highway Material Testing Laboratory

NABL - Accredited Laboratory as per ISO / IEC-17025 :2005

T-2377

Job No.: CTCE/BBMP/W.No.09/MSM/CSR-03/778i/CEMENT/2014-15 Date: 04.03.2015

TEST REPORT ON CEMENT

* CUSTOMER	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
*NAME OF THE WORK	:	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
*REFERENCE	:	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
SAMPLE ID	:	Cement
SAMPLE RECEIVED ON	:	02.03.2015
PERIOD OF TESTING	:	02.03.2015 to 04.03.2015

The results of the tests conducted on the cement sample are as follows:

Sl. No	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 8112-2013
1	Standard Consistency	IS-4031 (Part -4) 1988(RA-2009)	29.00 %	-
2	a) Initial Setting Time	IS-4031 (Part -5) 1988(RA-2009)	145 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part -5) 1988(RA-2009)	485 Minutes	Not More than 600 Minutes
3	Soundness by Le Chartlier Method	IS-4031 (Part-3) 1988(RA-2009)	1 mm	Not more than 10mm

*Information is furnished by the Customer/Representative.

Note:

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⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

****

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Technical Manager

#23/14, 7th Cross, 3rd Stage, 4th Block, Shakthi Ganapathi Nagara, Basaveshwaranagar, Bangalore-79.
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T-2377

Job No.: CTCE/BBMP/W.No.09/MSM/CSR-03/778i/SAND-Gradation/2016-17 : 04.03.2015

TEST REPORT ON DETERMINATION GRADATION OF FINE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

*** Name of Work** : Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015

Technical Reference : IS : 2386 Part 1 - 1963 RA-2007

Sample ID : Fine Aggregates

Sample Received on : 02.03.2015

Date of Testing : 04.03.2015

Total Wt. of Aggregates in gms **1000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)			
		Zone-I	Zone-II	Zone-III	Zone-IV
10	100	100	100	100	100
4.75	96.10	90-100	90-100	90-100	95-100
2.36	78.10	60-95	75-100	85-100	95-100
1.18	56.10	30-70	55-90	75-100	90-100
600 Micron	26.30	15-34	35-59	60-79	80-100
300 Micron	13.80	5-20	8-30	12-40	15-50
150 Micron	4.80	0-10	0-10	0-10	0-15

* Information is furnished by the Customer/Representative

Civil-Tech Consultants & Engineers Bangalore

Remarks : This sample is under Zone-I specific limits.

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Job No.: CTCE/BBMP/W.No.09/MSM/CSR-03/778i/AGG/GR/2014-15 : 04.03.2015

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

*** Name of Work** : Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015

Technical Reference : IS : 2386 Part 1 -1963 RA-2007

Sample ID : Coarse Aggregates (40mm)

Sample Received on : 02.03.2015

Date of Testing : 04.03.2015

Total Wt. of Aggregates in gms= **5000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA- 2007)	
		Graded	Single Sized
80	100	100	-
63	100	-	100
40	97.22	95-100	85-100
20	32.10	30-70	0-20
10	13.60	10-35	0-5
4.75	2.30	0-5	-

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits.

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T-2377

Job No.: CTCE/BBMP/W.No.09/MSM/CSR-03/778i/AGG/GR/2014-15 : 04.03.2015

TEST REPORT ON DETERMINATION GRADATION OF COARSE AGGREGATES

*** Customer** : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Agency** : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

*** Name of Work** : Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

*** Reference** : EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015

Technical Reference : IS : 2386 Part 1 -1963 RA-2007

Sample ID : Coarse Aggregates (20mm)

Sample Received on : 02.03.2015

Date of Testing : 04.03.2015

Total Wt. of Aggregates in gms= **5000**

Is Sieve Size in mm	Cumulative Weight Passing in %	Specific Limits as per IS :383-1970 (RA- 2007)	
		Graded	Single Sized
40	100	100	100
20	96.94	95-100	85-100
10	32.52	25-55	0-20
4.75	6.62	0-10	0-5

* Information is furnished by the Customer/Representative

Remarks : This sample is under Graded specific limits

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VIDYARANI P.K.
Technical Manager

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Job No.: CTCE/BBMP/W.No.09/MSM/CSR-03/778i/CUBE/2014-15 08.04.2015

TEST REPORT ON COMPRESSIVE STRENGTH OF CONCRETE CUBES

* Customer	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
* Agency	: **Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
* Name of the work	: Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
* Reference	: EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
* Sample ID	: Culvert Deck Slab Concrete
Size of cubes	: 150mmx150mmx150mm
Cross Sectional Area	: 22500 mm^2
Technical Reference	: IS: 516-1959 (Reaffirmed 2008)
* Grade of Concrete	: M_{20}

Compressive Strength as on : 28th day

Sample Received on : 08.04.2015

Sl.No.	* Date of casting	Date of testing	Weight of cube (Kg)	Failure load (KN)	Compressive strength (N/mm^2)
1	11.03.2015	08.04.2015	8.139	492.3	21.88
2	11.03.2015	08.04.2015	8.269	516.3	22.95
3	11.03.2015	08.04.2015	8.382	526.3	23.39

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/W.No.09/MSM /STEEL/2016-17 09.03.2015

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	:	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Date of Test	:	09.03.2015
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	10	0.62	514	557	13.25	O.K	O.K

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Job No.: CTCE/BBMP/W.No.09/MSM /STEEL/2016-17 09.03.2015

TEST REPORT ON REINFORCEMENT STEEL

Customer	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	:	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Date of Test	:	09.03.2015
Technical Reference	:	IS: 1786-2008

Sl. No	Nominal size (dia) (mm)	Mass per metre (Kg/mtr)	TENSILE STRENGTH			Bend Test	Rebend Test
			0.20% proof stress/Yield stress N/mm^2	Tensile strength (Ultimate stress) N/mm^2	Elongation percent gauge length		
1	16	1.58	520	563	13.45	O.K	O.K

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/Gradation/2014-15 11.03.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

Name of Work : Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015

Date of Testing : 11.03.2015

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	155	155	3.1	96.9	95-100
22.4	1525	1680	33.6	66.4	60-80
11.2	920	2600	52.0	48.0	40-60
4.75	640	3240	64.8	35.2	25-40
2.36	490	3730	74.6	25.4	15-30
0.600	415	4145	82.9	17.1	8-22
0.075	585	4730	94.6	5.4	0-8

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/Gradation/2014-15 11.03.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. M. Srinivas Murthy,**
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Name of Work : Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015

Date of Testing : 11.03.2015

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	135	135	2.7	97.3	95-100
22.4	1530	1665	33.3	66.7	60-80
11.2	1120	2785	55.7	44.3	40-60
4.75	850	3635	72.7	27.3	25-40
2.36	545	4180	83.6	16.4	15-30
0.600	360	4540	90.8	9.2	8-22
0.075	330	4870	97.4	2.6	0-8

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/Gradation/2014-15 11.03.2015

GRADATION FOR WMM
MORTH TABLE-400-11

Customer : **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.

Agency : **Mr. M. Srinivas Murthy,**
#17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.

Name of Work : Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.

Reference : EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015

Date of Testing : 11.03.2015

Material : WMM

Sample Location : WMM Mix Plant Oven Dry Wt (gm): **5000**

Is Sieve Size in mm	Weight Retained (gm)	Cumulative Weight Retained (gm)	Cumulative % of Retained	Cumulative % of Passing	Spec.Limits
53	0	0	0	100	100
45	190	190	3.8	96.2	95-100
22.4	1575	1765	35.3	64.7	60-80
11.2	985	2750	55.0	45.0	40-60
4.75	785	3535	70.7	29.3	25-40
2.36	465	4000	80.0	20.0	15-30
0.600	330	4330	86.6	13.4	8-22
0.075	415	4745	94.9	5.1	0-8

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/AIV/2014-15 11.03.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	11.03.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	304	306	
4	Aggregate Impact value = percent fines	21.85	21.94	
	100* (W_2/W_1)%			**21.89**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/AIV/2014-15 11.03.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Source / Location	WMM Plant
Type of Mix	Wet Mix macadam
Date of Testing	11.03.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	385	388	
2	Weight of aggregate passing 2.36 mm sieve after the test = W_2 g	82	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	303	305	
4	Aggregate Impact value = percent fines	21.30	21.39	
	100* (W_2/W_1)%			**21.35**

Comments:

→ Maximum allowable Aggregate Impact value for Wet mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/S-T/2014-15 11.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	11.03.2015

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.28%**

Elongation Index = **13.12%**

Result : Combined Flakiness & Elongation index 24.40%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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Job No.: CTCE/BBMP/W.No.09/MSM/WMM/S-T/2014-15 11.03.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	Wet Mix Macadam
Date of Testing	11.03.2015

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **12.35%**

Elongation Index = **13.60%**

Result : Combined Flakiness & Elongation index 25.95%

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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T-2377

Job No: CTCE/BBMP/W.No.09/MSM/CSR-03/778i/SDBC(QB)/2014-15 16.04.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

*CUSTOMER	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
*AGENCY	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
*NAME OF THE WORK	:	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	:	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
*SAMPLE ID	:	Bitumen
DATE OF SAMPLING	:	13.04.2015
PERIOD OF TESTING	:	16.04.2015

The results of the tests conducted on the bitumen sample using for Semi Dense Bituminous Concrete.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	84	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	298	Min. 220

*Information is furnished by the Customer/Representative.

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VIDYARANI P.K.
Technical Manager

****

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/AIV/2014-15 16.04.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.04.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	388	389	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	85	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	304	304	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.65	21.85	**21.75**

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/AIV/2014-15 16.04.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Source / Location	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.04.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	389	392	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	85	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	304	306	
4	Aggregate Impact value = percent fines 100* (W_2/W_1)%	21.85	21.94	21.89

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Shape_T/2014-15 16.04.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.04.2015

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Result : Flakiness Index = **11.35%**

Elongation Index = **13.20%**

Result : Combined Flakiness & Elongation index **24.55%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Shape_T/2014-15 16.04.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Technical Reference	IS 2386(Part 1) 1963 (RA 2007)
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	16.04.2015

Result : Flakiness Index = **12.78%**

Elongation Index = **13.92%**

Result : Combined Flakiness & Elongation index **26.70%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Stripping/2014-15 17.04.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Date of Testing	17.04.2015

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	3.2	3.30	96.70
2	3.3		
3	3.4		

Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95 %

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Sp_Wa/2014-15 17.04.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Type of Mix	Semi Dense Bituminous Concrete
Source / Location	Hotmix Plant, Bangalore
Date of Testing	17.04.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 3	
1	Weight of aggregate suspended in water with the basket	W_1 g	2014	2015	2016	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1264	1265	1266	
4	Weight of saturated surface dry aggregate in air	W_3 g	2008	2009	2010	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	744	744	744	
6	Weight of oven dried aggregate	W_4 g	1996	1995	1994	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.683	2.681	2.680	2.681
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.727	2.733	2.739	2.733
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.60%	0.70%	0.80%	0.70%

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Bitumen/2014-15 17.04.2015

BITUMEN DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

AS per IRC : SP : 11 - 1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
NAME OF THE WORK	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
SAMPLE I/D	Roads in HMT Layout 6th and 7th Block Roads in Ward No.09, BBMP, Bangalore.
DATE OF TESTING	17.04.2015

BITUMEN CONTENT DETERMINATION

Description	Trail 1	Trail 2
1. Weight of Mixture before Test, g	500	500
2. Weight of Mixture after Test, g	475.5	474
3. Weight of Asphalt and Mineral matter Extracted, g	-	-
4. Weight of Mineral Matter, g.	-	-
5. Weight of Ash, g		
6. Weight of Bitumen Extracted, g. (corrected)	24.5	26.00
7. Bitumen content in %	4.90	5.20
8. Average	**5.05**	

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Bitumen/2014-15 17.04.2015

GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

CUSTOMER	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
NAME OF THE WORK	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
SAMPLE I/D	Roads in HMT Layout 6th and 7th Block Roads in Ward No.09, BBMP, Bangalore.
DATE OF TESTING	17.04.2015

GRADATION AFTER EXTRACTION

Sieve Size in mm	Trail 1				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	29.56	6.22	6.22	93.78	90-100
4.75	265.3	55.79	62.01	37.99	35-51
2.36	56.35	11.85	73.86	26.14	24-39
1.18	45.15	9.50	83.36	16.64	15-30
0.3	22.36	4.70	88.06	11.94	9-19
0.075	32.26	6.78	94.84	5.16	3-8

Sieve Size in mm	Trail 2				Specified Limits as per MORTH specification table 500-15 (Grading-2)
	Weight Retained, gm	% Retained	%Cummulative Retained	% Passing	
13.2	0	0	0	100	100
9.5	36.25	7.65	7.65	92.35	90-100
4.75	255.5	53.90	61.55	38.45	35-51
2.36	50.22	10.59	72.15	27.85	24-39
1.18	42.15	8.89	81.04	18.96	15-30
0.3	22.15	4.67	85.71	14.29	9-19
0.075	35.26	7.44	93.15	6.85	3-8

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/AGG/2015-16

17.04.2015

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560
Name of the Work	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Sample I / D	Hot Mix Plant, Bangalore
Type of Mix	Semi Dense Bituminous Concrete (SDBC)
Date of Testing	17.04.2015

Total Weight of Sample: **5200** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	320	6.2	6.15	93.85	90-100	
4.75	2815	54.1	60.29	39.71	35-51	
2.36	630	12.1	72.40	27.60	24-39	
1.18	400	7.7	80.10	19.90	15-30	
0.3	325	6.3	86.35	13.65	9-19	
0.075	360	6.9	93.27	6.73	3-8	

Total Weight of Sample: **5300** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
13.2	0	0.0	0	100	100	Gradation satisfies Grade-II MORTH specification
9.5	325	6.1	6.13	93.87	90-100	
4.75	2815	53.1	59.25	40.75	35-51	
2.36	645	12.2	71.42	28.58	24-39	
1.18	415	7.8	79.25	20.75	15-30	
0.3	515	9.7	88.96	11.04	9-19	
0.075	325	6.1	95.09	4.91	3-8	

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Job No.: CTCE/BBMP/W.No.09/MSM/SDBC/Stability/2014-15 17.04.2015

TEST REPORT ON STABILITY OF MIX

Customer	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	:	**Mr. M. Srinivas Murthy,** #17, Opp Jyothi Gas Godown, 6th Cross, Kurubarahalli, Bangalore – 560 086.
Name of the Work	:	Improvements & Asphalting to HMT Layout 6th and 7th Block Roads in Ward No.09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	:	EE/BTP/BBMP/E-PMT/08(14164)WO/319/2014-15 Dated: 23.02.2015
Source of location	:	Hot mix Plant, Bangalore
Type of Mix	:	Semi Dense Bituminous Concrete
Date of Testing	:	17.04.2015

The results of the tests conducted on the Semi Dense Bituminous Concrete mix sample are as follows:

Sl. No	Description	Test Result 1	Test Result 2	Requirement as per MORTH (Table 500-16)
1	Marshal Stability, Kn	8.85	8.95	8.2 Kn (min)
2	Marshal flow, mm	2.65	3.25	2 – 4
3	Percent air voids in Mineral Aggregate	3.15	4.25	3 – 5
4	Voids in Compacted Mix	13.60	14.10	13 – 15
5	Percent Voids filled with Bitumen	67.50	68.55	65 - 78
6	Density, g/cc	2.26	2.27	--

Note:

⇒ This test report shall not be reproduced except in full, without written approval of the laboratory.

⇒ The results indicated above are based on the tests carried out on the samples received in the laboratory.

⇒ Any Query regarding the report must be reported within 30 days from the date of testing.

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